PHYSICOCHEMICAL ANALYSIS OF CHITIN BY EXTRACTION OF LEUCAENA LEUCOCEPHALA PODS WITH HCl

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ABSTRACT

The objective of this study is to characterized chitin by extraction of wild Leucaena Leucocephala pods at different aging with 6M HCl by using Fourier Transform Infrared (FTIR), Thermogravimetric Analysis (TGA) and Differential Scanning Calorimetry (DSC). Leucaena Leucocephala is chosen to be used in this study because it is abundantly and can be found easily along the road as it is widely spread in Malaysia. It is also available throughout the year. Leucaena Leucocephala is not fully utilized yet and it could be a new option and new resource for chitin. Results from FTIR shows that Amide I band in Leucaena leucocephala before and after extraction does not divided into two peaks which make it appear close to a β-chitin. Beside, Amide I band of Leucaena leucocephala before and after extraction is appearing wide (U-shaped) rather than sharp. From the results obtained, the chitin from Leucaena leucocephala is determined to be in the form of β-chitin.

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CHAPTER ONE
INTRODUCTION

1.1 RESEARCH BACKGROUND

Chitin is the second most abundant biopolymer after cellulose. It is naturally abundant, biodegradable and renewable polymers. Chitin is usually found in diverse living organisms, for instance, shrimps, crabs, insects and tortoise. It is also found in the cell wall of fungi, internal structures of invertebrates and exoskeleton of arthropods (Usman et al., 2016).

In organisms that consist of chitin, chitinases has crucial role in normal life cycle purposes such as morphogenesis and cell division, whereas plants synthesis chitinases as part of their defence mechanism against fungal pathogens (Brurberg; et al., 2005). Chitinases are present in a wide range of organisms such as bacteria, fungi, yeasts, plants, arthropods and humans (Hamid et al., 2013).

Chitinases (E.C 3.2.2.14) are hydrolytic enzymes that catalyse the hydrolysis of the β-1,4-N-acetyl-D-glucosaminidic linkages of the polysaccharide chitin (Wit et al., 2003). Most of fungi and bacteria consists of chitinolytic enzymes to transform chitin into compounds that can perform as energy source (Brurberg; et al., 2005). Various fungi contain chitin as the main components in the cell wall. There is potential of plant chitinase target fungi cell wall components as substrate and has anti fungi function (Saboki, Usha, & Singh, 2011).

Chitinases is one of the pathogenesis related (PR) toxic proteins that produced in response to plant defence mechanism due to the invading pathogen. Pathogenesis related proteins build up locally in the damaged and surrounding tissues and also in implausible undamaged tissues of plant. Pathogenesis related protein in plants was first recognized and disclosed in tobacco plants damaged by tobacco mosaic virus. The pathogenesis related proteins were found in various plants later on. (Saboki et al., 2011)